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AUTHOR	Chase, Craig C.; Rosenstein, Irwin
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ABSTRACT

As a planning guide for administrators and public school teachers of elementary school children, this document was developed to assist in planning and implementing outdoor education activities. The document contains objectives, an introduction, contributions of outdoor education to the curruculum, suggested instructional laboratory environments, 32 pages of suggested learning activities, and suggested materials and teacher resources (books, newsletters, journals, and periodicals). Additional sources of materials and information are included. (AL)

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OUTDOOR EDUCATION FOR ELEMENTARY SCHOOLS

THE UNIVERSITY OF THE STATE OF NEW YORK/THE STATE EDUCATION DEPARTMENT
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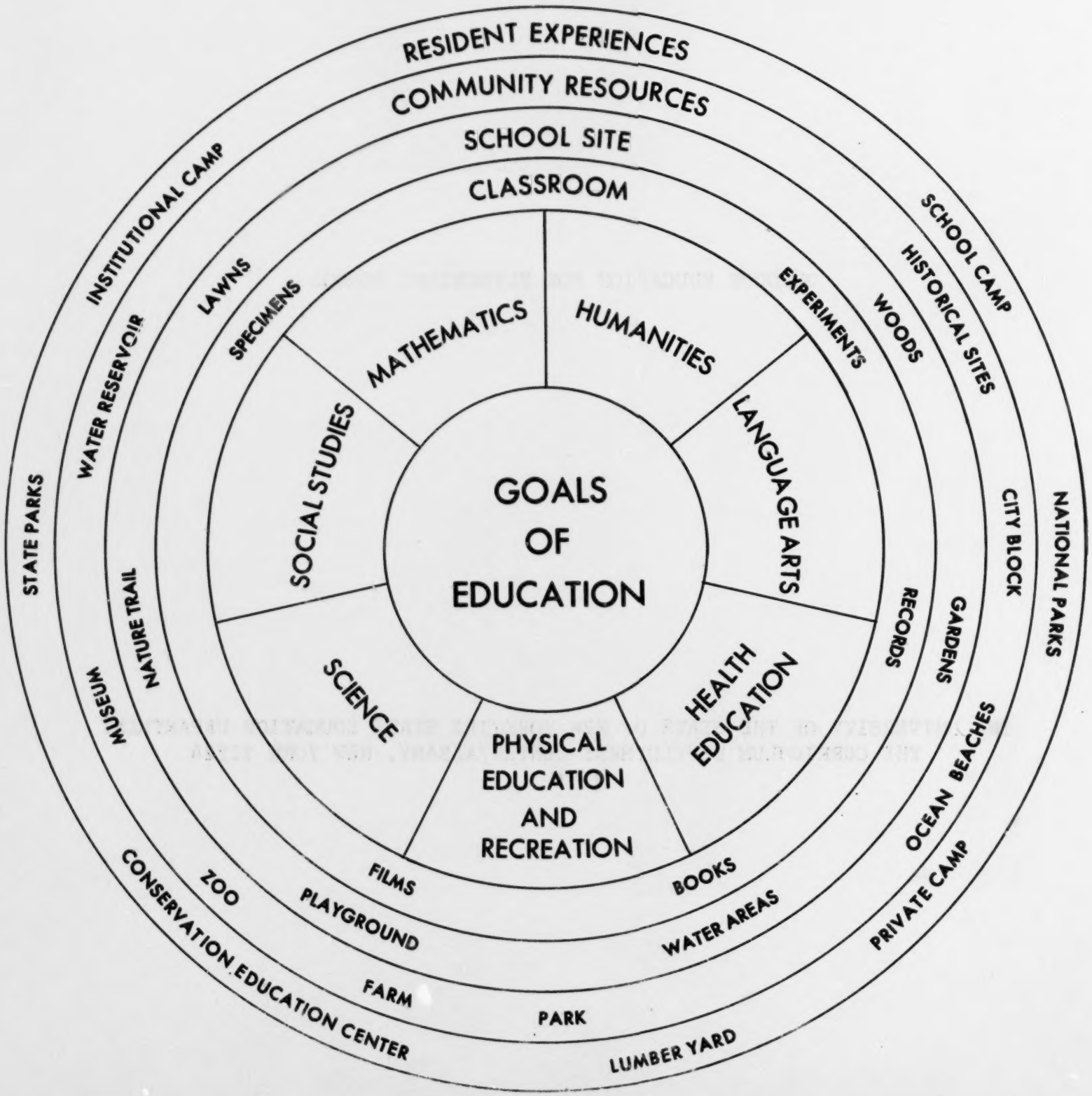
OUTDOOR EDUCATION



OVERVIEW

There has been considerable and increasing public awareness of our environment and the many factors that adversely effect it. One means of contributing to the solution of these environmental problems is through education and the development in young people of a sensitivity, an understanding, and appreciation of man's relationship to his environment.

This guide has been developed to assist school administrators and teachers in planning and implementing outdoor education experiences for elementary school pupils. While the guide is not an all inclusive treatment of outdoor education, it does attempt to present specific procedures and techniques that may be used by teachers to enrich the elementary school curriculum and make learning more meaningful for children.

The manuscript for this publication was prepared by Dr. Craig C. Chase, Coordinator of Outdoor Education, Yorktown Central Schools. It was reviewed by Ernest M. Coons, Coordinator of Outdoor Education, State University College, Plattsburgh. Revisions were made with respect to the constructive comments suggested.

Irwin Rosenstein of the Division of Health, Physical Education and Recreation coordinated the materials, reviewed the final manuscript and worked with the Bureau of Elementary Curriculum Development in the final preparation of the publication.

William E. Young
Director, Curriculum
Development Center

Robert H. Johnstone
Chief, Bureau of Elementary
Curriculum Development

George H. Grover
Director, Division of Health,
Physical Education and Recreation

OBJECTIVES OF OUTDOOR EDUCATION

Outdoor education experiences serve to attain specific objectives and contribute in varying degrees to the aims of education. Some of the objectives of outdoor education are:

- Understanding the natural environment and man's relationship to it.
- Developing, through direct experiences, the attitudes, values, and behavior necessary for the wise use of natural resources.
- Using the outdoors as a learning laboratory to vitalize and reinforce skills and attitudes developed in the classroom.
- Understanding and practicing democratic and social living.
- Acquiring an understanding of living happily and healthfully in the outdoors.
- Developing outdoor living skills, knowledge, and attitudes for the worthy use of leisure.
- Organizing and implementing pupil-teacher planned experiences based upon sound principles of learning.
- Encouraging creative and critical thinking through experimentation and problem solving.
- Developing the powers of observation as a means of learning through the involvement of all the senses.

INTRODUCTION

The study and utilization of the environment is an integral and essential part of a comprehensive curriculum for elementary school children. In such a curriculum the child studies his immediate surroundings, which include people, places, and things, and becomes more fully acquainted with the concepts, understandings, appreciations, and relationships of man and his environment. One means of providing such educational experiences is through outdoor education. Including such experiences in the school curriculum is the responsibility of the teacher.

THE MEANING OF OUTDOOR EDUCATION

Outdoor education is concerned with direct learning experiences which utilize the natural environment in attempting to achieve the goals of education. It is not a separate discipline, but an essential part of the school curriculum, and provides opportunities to enrich the education of children by extending the classroom beyond four walls in order to use the outdoors as a laboratory for learning.

Outdoor education is an interdisciplinary approach to education and uses the discovery approach to vitalize and enrich subject matter. Many curriculum and social development areas can be taught best in the outdoors and the child is better able to relate such learning to real life situations.

Outdoor education is directly related to the school, community, and life of the child. It involves pupils, teachers, and resource people planning and participating together so that learning is most meaningful in relation to the preparation and followup of the work done in the classroom.

Teaching in, for, and about the outdoors makes it possible for pupils to understand the world in which they live, to develop an understanding of the interrelationships of man and nature, to gain an appreciation of our social heritage, and to contribute to improved human relationships.

THE NEED FOR OUTDOOR EDUCATION

Education must adapt to meet the current needs of man. A number of changes are taking place in society today and these changes should be reflected in the educational curriculum of schools. Some of these developments have made outdoor education extremely important.

- Population increase has resulted in many more people using the resources of the earth.
- Urbanization has reduced or eliminated the opportunity for a number of children and youth to become involved with nature.

- Industrialization has caused individuals to place great emphasis on words and abstractions thereby creating a need for direct learning experiences.
- Automation has increased leisure time, but limited opportunity is available to gain the skills, knowledge, and attitudes required for its worthy use.
- The increased tempo of living in today's society has reduced the meaningfulness of man's work and has reduced his opportunity for creative expression.
- Automation has adversely affected the functioning of the human body, thus creating a need for other ways of developing and maintaining fitness.

CONTRIBUTIONS OF OUTDOOR EDUCATION TO THE SCHOOL CURRICULUM

There are a number of significant contributions which outdoor education makes to the school curriculum. Some of these are:

- Effective Learning. Learning occurs more efficiently and effectively through direct observation and experience. Moving from concrete learning to related abstractions permits greater insight and understanding for pupils.
- Realistic Education. Learning in the outdoors provides realism to the education process through application of the child's senses--seeing, hearing, touching, tasting and smelling. Understanding results from direct involvement, becomes more meaningful, and is retained longer through such a process.
- Concepts for Living. Concepts for living in today's world can be enhanced through direct learning experiences in the outdoors. These contribute to a greater understanding of abstract learning through actual involvement.
- Environmental Sensitivity. Learning beyond the four walls of the classroom develops an awareness of nature and man's relationship to it.
- Life Enrichment. Outdoor learning and living can provide significant contributions to physical and mental health. The acquisition of outdoor skills may meet the leisure time needs of individuals and serve to enrich life.

INSTRUCTIONAL LABORATORIES FOR OUTDOOR EDUCATION

Education beyond four walls is limited only by the imagination and creativeness of the teacher. Beyond the classroom numerous outdoor areas may be used to vitalize the school curriculum. Certain areas

may be located on the school site while others may necessitate field trips to places in the community. The number and type of these instructional laboratories will vary according to the geographic area of the school district. Use of such laboratories may be planned with a specific goal in mind or include a variety of educational objectives.

Some of the educational laboratories on a school site that have possibilities for outdoor education are:

Lawns	Nature Trails	Greenhouse
Woods	Astronomy Observatory	Bird Feeding Stations
Water Areas	Weather Station	Picnic site
Garden Areas	Woodcraft Area	Undisturbed natural areas

The following community resources which may be used for outdoor education are categorized according to curriculum areas.

Health Education

- Hospitals
- Sewage disposal plants
- Water purification plants
- Governmental and voluntary health agencies
- Dairy processing plants
- Restaurants

Humanities: Art, Music, Drama

- Art gallaries
- Concerts
- Theatrical productions
- Architectural tours
- Opera and ballet productions
- Motion picture theatres

Language Arts

- Libraries
- Newspaper plants
- Radio stations
- Book publishing companies
- Television stations

- Print shop
- Telephone company

Mathematics

- Computer centers
- Architect offices
- Lumber yards
- Retail stores
- Scientific research centers

Physical Education and Recreation

- Camp sites
- Lakes, rivers, streams, and beaches
- Parks
- Sports facilities and areas
- Winter sports areas
- Sports equipment manufacturing plants

Science

- Farms
- Fish hatcheries
- Nature centers
- Seashores, lakes, rivers, ponds
- Zoos
- Oil refineries
- Saw mills
- Rock quarries
- Planetariums
- City blocks or parks

Social Studies

- Archeological sites
- Museums
- Historical sites
- Government buildings and meetings
- Community services
- Transportation services

RESIDENT OUTDOOR EDUCATION EXPERIENCES

The culmination of outdoor education experiences for children should be the resident program. Resident outdoor education involves teachers and pupils living, working, and learning in the outdoors for a specific number of days and using this environment to make educational activities in the school curriculum more meaningful.

Facilities which may be used for a resident program will vary and school districts may either rent or purchase such facilities. Some school districts use facilities that are available in national and state parks, or conservation education centers, while others will contract with private summer camps or institutional camps.

CONTRIBUTIONS OF RESIDENT OUTDOOR EDUCATION

Resident outdoor education experiences contribute in numerous ways to the education of both pupils and teachers. Some of these values include:

- The opportunity for pupils and teachers to observe each other in a less formal and more relaxed environment.
- An improved pupil-teacher relationship developed through understanding and appreciation.
- The spirit and togetherness that results from teachers and pupils living together and working toward common objectives.
- A comprehensive living experience that permits time for indepth learning.
- The application of problem-solving techniques in learning about true life experiences.

FOLLOWUP AND EVALUATION

If outdoor education is to be of greatest educational value to children, there should be classroom planning prior to such experiences, as well as followup and evaluation procedures.

Planning for outdoor education will vary according to the types of experiences involved. For school site and field trip experiences, planning will be done primarily by teachers and pupils. In a resident program, planning should be a cooperative effort involving teachers, pupils, parents, administrators, and resource personnel. Educational goals and objectives should be identified and these may differ for each grade or school. Parents should be informed about all aspects of the resident program, and if possible, should be given the opportunity to visit the facility before the program begins.

Followup activities give more meaning to teacher-pupil planning and the actual outdoor education experience. They unify all aspects of the program and contribute to the value of the entire experience. The classroom teacher coordinates the total program and, therefore, should give direction to followup procedures. Some activities which may be used to advantage include class discussions, creative writing, musical compositions, art work, bulletin board displays, photographs, models, collections, and living specimens.

Evaluation is an essential part of the education process and should be related to the goals and objectives of the program. Evaluative instruments and techniques that may be employed in evaluating outdoor education experiences include:

- Pupil, parent, and teacher evaluation forms
- Anecdotal records
- Pupil logs
- Personal interviews
- Teacher-made tests
- Sociograms

SUGGESTED LEARNING ACTIVITIES

The following are suggested learning activities that may be used by teachers to incorporate outdoor education experiences into the elementary school curriculum. These learning activities are not intended to be all inclusive, but merely to serve as examples of the many types of outdoor learning experiences that may be used to enrich the curriculum. The activities are organized according to subject area and learning level. However, some of the activities may be related to more than one area of the curriculum.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Humanities Primary Grades Art	Nature provides some art materials that can be used as we find them.	Experiment by rubbing 3 x 5 cards with different rocks, sticks, leaves, berries, and soil. Examine the different color streaks.	
	You must experience something before you can draw it.	Using all or a combination of the five senses, have pupils draw certain objects in nature.	Assist pupils in comparing the results of the drawings to the same object drawn when fewer senses were used.
	Through observation a variety of designs are evident in nature.	Have pupils identify various designs in nature such as round (sun, berry), straight (grass, three trunk), crooked (edge of a leaf, objects on the horizon).	
	Drawing permits a child to relate to his environment.	Have children draw different things that they might see in a field, a forest, or on the school site.	Follow this activity with a field trip, have the pupils draw some of the things they saw and compare their drawings.
		Make dioramas that show seasonal changes in the environment.	
	Environmental resources may be used artistically in a variety of ways.	Make spatter prints of leaves with a toothbrush.	Place leaf on the paper to be painted. Dip toothbrush in paint. Run thumbnail over brush so that paints spray on the leaf outline.
		Bleach colored paper to show leaf designs by placing in the sun with the leaves on it. Exposure (several hours) will lighten the paper exposed while the covered areas will retain a darker shading.	
		Mount flowers between two layers of contact paper. Type name and mount with the flower. These mounts will retain original color for a long time and can be handled without fear of harming.	Assist children in thinking of questions about individual flowers.
		Using charcoal have pupils sketch natural objects which interest them. Use paper that is somewhat rough in texture.	Show pupils how to outline object with charcoal and shade the picture by rubbing it with their fingers.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Drama	Nature can stimulate a child's creative expression and offer opportunities to share experiences.	Activities of animals and movements of trees and other plants in the wind can be personified. Have the class guess what living thing is being portrayed.	Emphasize that before one can interpret something he must first observe it closely.
		Pupils imagine they are people from outer space. Have them dramatize various natural objects they observe when they visit the Earth.	
		Children pretend they are particular animals and perform their trials and tribulations of a trip through the woods.	Emphasize the different habits and other characteristics of animals.
		Have pupils prepare a dramatization of animal stories such as Peter Rabbit, The Hare and Tortoise, and Three Billy Goats Gruff.	Discuss why "animal talk" is used in stories and the difference between "make-believe" and realism.
		Have pupils role-play various animals preparing for the winter.	

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Music	Musical activities provide opportunity for creative response by children.	Encourage students to try imitating animal sounds. After some preparation, have each child present his imitation of at least one.	Primary children, because of their lack of learned inhibitions, are very good at this activity.
		Have pupils make different rhythmic sounds while the rest of the group skips or dances to the sound. Use natural objects that the pupils find as sound producers.	Use sound producers like pebbles, seeds, sticks, dry grass or branches.
	Songs are one media by which individuals communicate.	Have pupils put simple words to bird songs so it will be easier for them to remember different kinds of birds.	Use a tape recorder and/or bird song records for practice before going outdoors for observations.
		Assist pupils in writing new words to songs related to the outdoors. At some future time help them to compose original tunes to songs about nature.	Folk songs such as "Paul Bunyon" and "Johnny Appleseed" can be used for such activities.
	Some natural objects can be used to make musical instruments.	Have pupils collect natural objects that can be made into rhythm or musical instruments. After completing the instruments have the class participate in a rhythm band.	Objects such as hollow reeds, sticks, gourds, rocks, and branches with dried leaves are good for such an activity.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Health Education	All living things need food and water.	Grow plants from seeds, with and without fertilizer, with and without water, with and without both. Compare the rates of growth and the general health of the plants.	Lima beans produce a rapidly growing plant. Use a clear plastic glass as a container and place the bean in the soil at the edge.
	Animals get their food from plants and from other animals.	Have the class visit a zoo and observe what the different animals eat. Discuss the different kinds of foods that various animals eat.	Use animals which are familiar to the children.
	Water may vary according to its source	Collect samples from as many different water sources as possible, e.g. drinking fountain, stream, fire hydrant, mud puddle, cistern, drainspout, etc. Collect in a clear plastic cup and cover each cup with clear plastic food wrapping. Observe and record clarity, color, visible life, dirt. Allow to stand for several days and observe again.	Children may be surprised at the material present in municipal water. Some life may show up after the sample is aged.
	Pollution of the air may be caused by solids.	Place a wide mouth glass jar filled one-third with water on a corner of a play area. Near the end of the school day look for materials that have settled out of the air.	Discuss air pollution and the sources of these solids in the community.
	Pollution of the air may be caused by a gas.	Place a paper tissue over the exhaust pipe of a car. Let pupils inspect the tissue after one minute.	Carbon monoxide and poison gas is expelled. This gas can cause death because it unites with hemoglobin in the blood thereby displacing oxygen.
	Dentists help to keep teeth healthy.	Arrange a trip to a dentist's office. Allow sufficient time for observation and discussion of the use of various instruments and the role of the dentist in maintaining oral hygiene.	As a followup have children act out their visit to the dentist.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Health Education (cont'd.)	Safety signals are important and should be obeyed.	Take a walk around the neighborhood. Identify as many safety signs as possible and discuss them.	Determine what additional safety signs are needed.
		Take the class to a marked, signalized intersection and cross the street correctly. Emphasize the importance of watching for turning cars.	Supplement this activity by having the adult crossing guide or local traffic policeman speak to the class.
	Color is a factor to consider when selecting clothes.	Obtain two tin can tops of the same size. With the same type paint, color one black and the other white. Put outside in a snowbank, being sure that there is an equal amount of snow beneath each. Observe to see which melts out of sight first.	This activity can help children to properly select clothing for warm or cool weather. Dark clothes absorb the heat and light clothes reflect the heat.
	Many people contribute to making the community a safe place to live and work.	Have pupils visit a police station, firehouse, telephone company, etc. Ask children to imagine what life would be like if a service of the community were terminated for a week.	Have pupils make a mural showing the workers who provide services for the community.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Language Arts	Learning the names of things through direct experiences gives greater understanding of why objects have names and the importance of names for common understanding.	Take the class on an outdoor experience. Also bring along 3 x 5 cards and a felt tip pen. As new vocabulary is introduced write the single word in large letters for all to see. Pronounce the word and point to the object discussed.	Create as many sense impressions of a new word as possible--have students say it, write in soil or snow and see the word as you have written it on the 3 x 5 card.
	Discussing things that are common to all contributes to better communication and increased vocabulary.	Have pupil groups adopt a tree. Pupils observe it a number of times during the school year. Have the class make a chart describing the tree and any changes noted.	Class might decide on characteristics to be noted before going out.
	Observing, understanding, and organizing are important aspects of the learning process.	Have the pupils develop a list of words and phrases that describe a particular natural object. Put the words and phrases into categories such as size, shape, and color.	Examples of natural objects that could be used include leaves, flowers, bark, etc.
		Divide pupils into small groups (4-6). Give each group a 3 x 5 card with a single word or picture on it. This card is a clue that the group uses to progress to another clue.	Teacher does not verbalize the clue. Each group must recognize and interpret its clue to progress.
	Using all ones senses develops curiosity, understanding, and appreciation concerning the outdoors.	Take a sensory walk with pupils around the school site. Note and describe the smell, feel, sight, and sound of living things encountered. Learning by tasting might be pursued at the teacher's discretion.	If it exists nearby, start by identifying poison ivy.
		Read Japanese Haiku poems and discuss content. At intermediate or upper levels have pupils write their own.	Haiku poems express a simple thought about nature. The first line should contain five syllables; the second, seven; and the third line, five.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Language Arts (cont'd.)	Vocabulary may be increased by means of observing and describing ones environment.	A word building game for pupils is played on the spot when the group is resting. Pupils take turns naming one thing at a time that they can see, from where they are resting, that has not been named before.	As group skill increases, try making the game require more skill by naming a particular category to which named objects must belong, e.g. must be green, an animal, found below knee height, etc.
	Stories, poems, and other language activities permit children to share experiences.	Have pupils write a story or keep a diary of a field trip. After a second visit have pupils write their experiences again and then compare the two.	
		Each pupil draws a picture of something seen in a natural area. Then tell or write a story about the picture.	Ask pupils to tell why they chose the scene they did.
		Scramble names of plants and animals. When pupil unscrambles word, have him tell a fact about the plant or animal.	The degree of difficulty of the words used should be in relation to the grade level of the children.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Mathematics	Geometric shapes can be found in the objects of nature.	Have pupils identify and name various geometric shapes in a specific area.	Objects that might suggest geometric shapes include leaves, trees, water areas, buildings, parking lot, etc.
	Distances can be measured in units such as inches, feet, yards, and meters.	Using rulers, yardsticks, and meter sticks, measure specific lengths and distances such as the width of a leaf or the distance between trees.	Discuss which units of measurement would be best to use in specific situations.
	Measurement is as accurate as the instrument used to measure. Counting is exact.	Have pupils pace the distance between the same two trees. Have other pupils measure the distance with a yardstick. Compare their answers and discuss why they differ.	The measurements differ because the same standard is not being used. Excellent charts on the history of measurement are available from the Ford Motor Company, Dearborn, Michigan.
		Using measures made in the classroom, lay out on the playground a square foot, square yard, etc.	Measures may include cardboard, newspapers, magazines, string, etc.
	Maps are a symbolic picture of the landscape.	Obtain a topographical map of the area. Walk with the class to the benchmarks shown on the map. These will indicate their height above sea level.	Topographical maps are available from the United States Geological Survey, Washington, D. C.
	Numbers and counting have greater meaning and association when applied to firsthand situations.	On a field or playground have all pupils actively participate in activities concerned with counting. Such directions as take two steps forward; pick up five leaves; place six sticks in order of size with the smallest first and largest last, can be used.	
		Have pupils conduct a tree census. Count all the trees of each variety that can be seen on the school site or in a selected area of the community.	Concepts of ten's and hundred's can be introduced or reinforced.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Mathematics (cont'd.)		In sunlight and in shaded areas have children compare temperature readings at the same place during different times of the day or on different days. Pupils record temperature readings.	Offers opportunities to practice counting by two's.
		Gather leaves and press them for use on sheets of paper or on a bulletin board to show the meaning of each of the numbers from 1 through 10.	Using natural objects in this manner gives pupils a greater understanding of the meaning of numerals.
		Take children to an oak tree early in the fall. Have each child collect a set of acorn caps that can be used as "counters" in his number work during the remainder of the school year.	Children enjoy collecting objects and using them.
	Comparison of objects can be made in regard to height, size, and distance.	Take pupils on a walk around the school site. Compare the size of shrubs with trees, nearby trees with trees farther away, etc.	

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Physical Education and Recreation	The use of physical activity as a means of learning contributes to the physical and mental development of the child.	Divide class into two groups and have them form lines facing each other about 50 yards apart. Establish a goal line between the two groups. One team is called true. One team is called false. The teacher makes statements about natural phenomena (e.g., all rabbits eat meat). If the statement is false, false team chases the other team members until they cross their goal line. Those who are caught become members of the false team. If the statement is true, true team chases the false team.	
		Play "Simon Says" using animal motions. Designed to encourage free expression among pupils.	Some animal movements to use are: duck walk, seal walk, bird flying, snake crawling, elephant walk, snail crawl, inch worm, bunny hop, frog jump, fish swimming, kangaroo hop, bear amble.
		Divide pupils into groups. Have pupils collect leaves from different trees. Collect as many leaves from each group as there are groups. Place a pile of leaves a set distance from each group and have the pile contain one leaf from each tree. The teacher calls out the name of a tree and the first child in each group runs to the pile of leaves, locates a leaf from the tree named, and holds it up. For each leaf correctly identified a point is scored for that group. The leaves are returned to the piles and each pupil goes to the end of the group. The same procedure is repeated until each child has a turn.	
		Divide pupils into groups of 5-6 individuals. Give each group a list of natural objects to be collected during a time period which ends when you give a signal. The first group to return with all the objects on the list wins.	Natural objects might include a maple leaf, dead insect, dust, blade of grass, seed, red leaf, pine needle, etc.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Physical Education and Recreation (cont'd.)		The class is divided into groups. The teacher calls out a specific nature object and one child from each group runs to the object, touches it and returns to his group. Points are scored according to the order of finish. The activity is repeated with a different child from each group participating.	Natural objects such as leaves, trees, acorns, etc. may be used.
		Pupils select partners. Each pupil has a small rounded stone and eight or ten small twigs about 3 inches long. Begin with a small stone in front of each player. Players take turns, each placing one twig on top of his own stone. Any twig that falls off the stone is added to the players original pile. The player to pile all of the sticks on the stone first is the winner.	While visiting a natural area, either on the school site or in the community, have pupils collect stones and different types of twigs that can be used for this activity.
		Play shadow tag. Select a player to be it. Player who is it can tag a player by stepping on his shadow. This player then becomes it.	Discuss light sources, what causes shadows and the direction the shadow moves.
	Through games children are encouraged to observe, to think, and to imagine.	Give all the pupils a chance to study for one minute a collection of 10 or more objects. At the end of that time have three children leave the group. While they are gone have a child remove one object. When they return, each tries to be the first to guess the missing object.	The game can be played by changing the positions of one or more of the objects.
		Divide the class into groups and children walk single file. At short intervals each child takes turn pointing to some object of nature that the child in the lead must identify. Failure to name the object sends him to the end of the line.	The activity can be played with partners who decide on a single answer.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Science	Organisms depend on their environment for the conditions of life.	Construct an aquarium or terrarium for classroom use, using locally gathered plants and animals. Observe the development and balance required in an environment. Pupils will be especially attentive to the living things they gathered.	Discuss what conditions are necessary for living organisms to survive. As pupils ask questions refer them to reference materials nearby.
		Have groups of pupils adopt a tree and observe and record the changes during the school year.	Have pupils tell how the tree changes with the seasons.
	Changes in temperature affect different things in different ways.	Have children bring in small containers of a variety of shapes and material. Fill with water and place outside in cold weather so that the liquid will freeze. Observe the freezing process noting where crystals form first and which containers begin to freeze first. Now place tight covers on the containers and allow to freeze overnight. Children will be impressed with the power of freezing water to break or uncover the containers.	The larger containers with liquid have more heat to expend and freeze last. The materials that readily conduct heat and cold will lose their heat first. Freezing water breaks pipes, cracks rocks and moves sidewalks because the water expands before becoming crystalline.
	Seasonal changes affect life on the earth.	Visit a natural area on the school site or in the community. Observe and record specific changes that take place.	Discuss how changing seasons affect life in the forest, in the pond, and in our own surroundings.
	Living things have likenesses and differences.	Take pupils on a trip to the woods. Observe wildlife and note the likenesses and differences of animals.	In the classroom have stuffed or possibly live animals on display. Permit children to examine their physical characteristics.
		Observe an ant home to identify individual ants and their jobs. Give a descriptive name to the work that each one does.	Sidewalks as well as school yards make ideal observation points.
		Using common plants around the school, have small groups of students compare pairs of different plants for some of the following: leaf arrangement, color, root shapes, location, reproduction, smell, seed dispersal, value to man, or length of life span.	This might be a series of lessons rather than a single time block.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Science (cont'd.)		Identify a square foot of soil in different areas of the school site. Determine the number and types of different insects. Discuss their similarities and differences.	
	Man uses all of his senses to explore the world around him.	On a walk through the woods or on the playground have pupils use all their senses to discover things. Have them describe what they saw, heard, felt, smelled, and tasted.	Permit children to taste only those things specified by the teacher.
	The earth revolves around the sun and receives heat and light from the sun.	Mark the shadow of some object in the fall, again in the winter, and again in the spring. Observe the different positions.	Be sure and mark the shadow at the same time of the day.
	Trees provide lumber for building. Building materials such as iron, concrete, and glass come mainly from rock formations.	Take pupils on a walk around the school yard and discuss the different materials used in the construction of the building and the playground.	

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Social Studies	Neighborhoods play an important part in man's life.	Take pupils on a walk around the neighborhood. Discuss roads, buildings, homes, etc. in the neighborhood. Have pupils construct a neighborhood model of what they saw.	Use materials such as cartons, grass, paper, twigs, etc. in constructing the model.
	Farms contribute to the economy of a community.	Visit a farm and discuss its relationship to the economy of the community. Identify crops used on the farm and those used in the city. How does the farm relate to people in the community?	
	Pioneers took most of their food from nature.	Collect some seeds of oats, wheat, blue vervain, or sunflower. Grind between two smooth rocks (similar to Indian grindstones). Sift the grindings to separate the flour (ground-up seeds) from the bran (seed covers).	Discuss what pioneers could and could not eat. Make some food products, such as bread or pancakes and discuss the amount of work involved in the preparation of such food.
	It is important to understand our heritage and to preserve it.	Take children to visit places of historical interest in the community. Discuss the settlement of the community and natural resources that contributed to its growth.	Buildings, monuments, parks, etc. can be directly related to important historical events.
	Community helpers are important for a community to function properly.	Have pupils visit places that provide community services such as a post office, police department, or fire department. Discuss the role that each plays in the community.	
	Good citizens must feel a personal respect for their environment.	Have pupils identify an area of the school site or neighborhood that needs to be cleaned up. As a class project clean up the area. Make a collage of some of the manufactured materials discarded.	Emphasize appearance of the area before and after by means of drawings, photography, etc. Discuss time and cost factors of keeping areas clean.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Primary Grades Social Studies (cont'd.)		A bird feeder located near the classroom offers opportunity for bird study both in and out of the classroom.	This type of activity makes children more aware of birds, their care, and the contributions they make to their habitat.
	Maps can show a variety of places and things.	Make a map of the classroom and then the school building. Take the children outside and help them make a map of their school grounds.	Use keys to represent different objects such as a circle for a tree and a square for a building.
		Have children bring in road maps and discuss their use. Also have children examine globes.	
	Geography involves the study of land forms.	Place a block of ice on a pile of earth. Let the sun melt the ice. Look for channels, moving rocks, water falls, deltas, etc.	Relate the understandings gained from this activity to soil, crops, climate, and industry.
		Explore a water area. Around the edge look for patterns that resemble bays, peninsulas, etc. Discuss why many communities are located near bodies of water.	

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Humanities Intermediate Grades Art	There are different kinds of drawing materials that can be used from nature.	On a field trip, have pupils collect such things as stones, grass, dirt, berries, etc. In class, have them use these materials on different surfaces and with various types of finishes.	There are four classifications of drawing materials obtained from nature; media (sticks), tools (mosses), surfaces (cardboard), and finishes (varnish, plastic). When using spray finishes, be sure the room is well ventilated.
	There are other ways than painting and drawing to show nature's beauty.	Collect natural materials for a collage. Arrange the materials into a creative design or picture. Paste, glue, or staple the materials on a cardboard background. Lines and colors may be added with crayons, chalk or paint. Clear lacquer can then be applied.	Natural items may include leaves, seeds, feathers, pine cones, soil, twigs, etc.
	Art forms are everywhere in nature and can be used in many different ways.	Pupils collect small waterworn stones of various colors and shapes and arrange them in a design or picture. Pebbles can be arranged in clay with grout, or with adhesive on a cardboard or wood backing.	This type of activity can stimulate interest in a discussion of rocks and their classifications.
	Sculpturing offers opportunity for self-expression and creativity.	Several children work together in collecting snow and creating their object. An animal, a person, a bird, etc. may be portrayed with the snow.	Snow sculpturing is an excellent spur-of-the-moment activity when snow is available.
	Art experiences permit pupils to acquire a sense of perspective.	Take pupils on a field trip and have them observe the apparent size of some object in the distance. Then have them see the different size changes that occur as they come closer to it.	Use a small cardboard frame to enclose the area being sketched at a distance. Then have children use the same frame for sketching part of the same area when they are closer.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Drama	Attentive observation is required to dramatize movements or actions.	Act out movements of plants and animals encountered during a class exploration (charades). Let other class members guess the type of living thing.	
	Creativity can be developed through dramatic activities.	Dramatize the occupations of various Indian and pioneer workmen. Each class member acts out an occupation.	Using a natural environment makes the actions more realistic. Have the class guess the identity of the occupation.
		Using mud or natural clay have pupils make simple puppet heads that represent an animal, plant or bird. Use heads as characters in dramatizing outdoor activities.	Let pupils choose partners for the imaginary conversations. Have children use their knowledge of the outdoors in their conversations.
		Have children dramatize a trial in which people who are guilty of poor conservation practices are tried. Farmers, housing developers, industrialists, etc. may be included.	Have the people convicted make up a conservation pledge and present it to the class.
	Participating as a member of a group helps build confidence and gives one a sense of belonging.	Have the children record their outdoor activities in ballad form and dramatize the ballad.	Give all pupils the opportunity to participate in this activity.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Health Education	It is important to recognize harmful plants.	Have children inventory plants on the school site to identify harmful plants. Make a bulletin board display and ask pupils from other classes to add to the inventory.	Some harmful plants might be poison ivy, deadly nightshade, ragweed, mushrooms, nettles, etc.
	Different types of pollution are present in the environment.	Coat glass plates with vasoline and pin with snap clothespins in different locations for the same length of time. Check the plates for air-born pollution.	See if the pollution increases as you come closer to the source (incinerator, factory, highway, etc.).
	Public health workers help to keep people well.	Take pupils on a field trip to community health facilities such as a water purification plant or a sewage disposal plant to find out how it operates and what happens to the refuse as it goes through the plant.	
	Proper care of the teeth is an important factor in dental health.	Cut a 3-inch twig of dogwood or sweet gum. Have a pupil gently chew it. It will soon shred into long strings which can be used like dental floss.	This is commonly called an Indian toothbrush. Children's interest in this activity will provide the teacher with an opportunity to emphasize the need for good dental health practices.
	Children should understand the purchase and use of drugs and medicine.	Have pupils visit a natural area and study the plants and animals. Then discuss various medicines which are derived from plants and animals.	Have pupils understand the procedures for obtaining a prescription. Point out that only medical doctors and dentists are licensed to prescribe medicines for humans and only registered pharmacists can fill prescriptions.
	A knowledge of the cause of accidents and their prevention helps to reduce the number of accidents.	Have pupils go out to the playground, parking lot, and other areas adjoining the school site and identify safety hazards that could cause accidents.	Assist pupils in setting up a safety patrol. Information is available from the American Automobile Association.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Health Education (cont'd.)	A good civil defense program is essential for every community.	Take the class to visit a demonstration shelter in the community. Discuss the importance of preparing for national emergencies and various details involved.	As a followup to this activity children may organize a class committee to interview residents about their preparations for civil defense. Contact local civil defense offices for information and printed materials.
	Knowledge of the relationship between nutrition and health provides a basis for selecting foods that will provide the nutrients people need.	Take the class to visit a farm. Discuss the basic four food groups and their nutritional value. Have the class as a group plan a menu for the school lunch.	The basic four food groups involve milk, bread and cereal, fruit and vegetable, and meat and fish. The school lunch supervisor could be used to assist pupils in their planning.
	Having a knowledge of first aid gives children a feeling of some competency to care for themselves and others.	Have the class walk around the school site. Describe several accident situations that might occur in various places. Discuss with pupils the general first aid procedures that should be followed in each case.	Point out such factors as determining the victim's injuries, what injuries should be dealt with first, securing necessary help, and dealing with external factors like weather.
	Physical activity should be planned as part of one's daily routine.	Have the class visit different recreation areas in the community. Discuss the importance of recreation with respect to physical and mental health.	Health and physical education teachers can be used as resource people and can talk with the class about health and fitness.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Language Arts	Children should develop aesthetic values of the outdoors.	Have pupils draw or paint a scene on the school site at different seasons of the year. Have the children discuss or write about each scene or compare the scenes.	
		Have each pupil choose a particular area of nature that provides him with aesthetic beauty. Permit the child to observe the area for an extended period of time. Have him give a report to the class.	Assist each child in developing a talk or story about his observations and feelings.
	Children should know how resource materials can be used to increase their knowledge.	Following a trip to a natural area take the children to the school library. Help the children to locate resource materials that they could use to answer questions about their visit.	Have the pupils send for printed materials that could be used by the class.
	Recall is important to determine the effectiveness of learning.	Snap photographic slides as children are working in the out-of-doors. At a later date, set up a tape recorder as the group is shown the slides. Ask individuals to describe what was happening.	
		After an outdoor experience with students ask them to describe different living things encountered. After listing, have the class select adjectives that they feel are the most appropriate descriptive terms.	Give students an example of a living thing "sensed" during a class exploration, e.g., a forest is--silent, creepy, wet, cool, soft.
	Pupils should impress other individuals with the need for good conservation practices.	Organize a system of pupil guides to take other classes on nature walks about the school site.	Your outdoor teaching will be mimicked and embellished by the pupils selected.
		Have pupils organize an assembly program about the importance of conservation.	
		Have pupils make charts, displays, and posters showing good and poor conservation practices.	

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Language Arts (cont'd.)	Information should be organized effectively and correctly.	Pupils serve as "living labels" for a tree or some other object and provide other pupils with information about it when asked.	This activity provides opportunity for oral language experience. Other classes could be taken on a tour with, and stop with, their guide to "hear" each label.
		As a class project develop a printed guide for a school or neighborhood nature trail.	Include in the guide not only statements, but clues and questions as well.
	Informal class discussions can serve as a valuable learning experience.	Following an outdoor education activity have an informal discussion to evaluate the experience. Ask questions such as "What did we do?", "What did we learn?", and "What was most exciting?".	Set up procedures that encourage all children to participate in the discussion.
		Have pupils discuss pollution. In small groups have them go outdoors to observe. When they return, the group should pool their outdoor observations to generalize and arrive at their concept of pollution, types, causes, proofs, and treatment.	Some of the noticeable types of pollution are air, water, sound, thermal, soil, and landscape.
	Individuals see their environment in many different ways.	Have pupils participate in an outdoor experience. Compare how differently each person perceives his environment by having each write or tell about his conception. Share what each one has written.	Use Ranger Rick articles as samples of good writing.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplementary Information for Teachers
Intermediate Grades Mathematics	The number of elements in a set can be determined by counting.	Obtain a cross section of a large tree being taken down. Determine the age of the tree by counting the number of rings. Plot United States history from the time the tree was small (center rings) until today (outer most ring).	Rings are formed because of a variance in growth rate at different times of a year. You may wish to establish a time line by having strings run from a growth ring to a white card explaining the significance of that particular year.
	Shadows may be used to estimate the height of tall objects.	Measure the height of a child. Then determine how many times the length of his shadow can be measured off along the shadow of a tall object (tree) whose height you want to determine.	Assist children in understanding that the height of the tree is the same number of times the height of the child as the trees shadow is of the child's shadow. Discuss the concept of similar triangles and help children in doing the arithmetic.
	The steepness or angle of the slope of a hill can be measured by using a clinometer.	Have children work in groups of three. One child stands at the bottom of a hill and sights along the top edge of a clinometer toward a second child of approximately the same height who is standing on top of the hill. When his line of sight is on the eye of the other child, a third child records the angle on the side of the clinometer.	A simple clinometer can be made by taping a protractor to a meter stick with the protractor hanging under the stick. Have a weight on a string hanging from the meter stick on the center of the protractor. The angle of incline or depression is the number of degrees shown at the point where the string crosses the semicircle.
	Water flows at different speeds.	Float an object in moving water and measure the distance it travels in either seconds or minutes. If a leaf goes 88 feet in 1 minute, it would travel 60 times 88 feet, or 5280 feet in 1 hour. Since there are 5280 feet in 1 mile children would find that the speed of the leaf is 1 mile per hour.	Children are curious about the speed of water. A stream, a river, or water in a gutter in the street may be used.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Mathematics (cont'd.)	Use of a compass involves geometric principles dealing with the number of degrees in a circle.	Have pupils hold a compass by its flat base and rotate the metal housing until the degree or direction they want is lined up with the direction of the travel arrow in the base. With compass level turn yourself until the red-tipped compass needle and black outlined arrow are pointing in the same direction.	This type of activity is of value in the study of map making. Silva compasses and orienteering guides are available from the Silva Company, Laporte, Indiana.
	Height and width may be measured through the application of the isosceles right triangle method.	Locate a tree and back away from it until an imaginary line from your eyes to the top of the tree forms a 45 degree angle to a line parallel to the ground from your eyes to the tree. To determine the height of the tree measure the distance from you to the tree by pacing and add this to the height of your eyes from the ground.	Use a clinometer to help determine the 45 degree angle. In an isosceles right triangle the length of the two short sides is equal.
		To measure the width of a stream or river use a compass to identify a visible point on the bank directly opposite you. Mark your position and walk along the bank until you reach a point at which a line from you to the first point on the other bank makes a 45 degree angle to a line along the bank of the river. To determine the width of the stream or river measure, by pacing, the distance between the two points on your side.	
	Bar graphs and picture graphs are a useful method of tabulating information.	Have pupils make a tree survey of an area that has 4 or 5 species. Show the results by means of a graph.	

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Music	Responsive singing by groups in the outdoors can be an enjoyable experience.	Take pupils on a walk and let them listen for sounds of nature. Then have pupils form groups and have responsive singing to selected songs.	Cooperative planning by both the teacher and pupils will contribute to the enjoyment of the activity.
	Listening to sounds helps to accustom children to different tones of music.	Have children listen to the different sounds of nature. Which birds make good sopranos? Which birds make good altos? What kind of frog would make a bass?	
	Nature provides resources that can be used for rhythmic activities.	Make rhythm instruments from natural materials found around the school site. Log drums, gourd rattles, grass, acorn and willow whistles, stone rattles, leaf rustlers, scrapers (notched wooden sticks), tambourine (bent branch tied in circle and covered with chamois, bottle caps tied to edges), and ankle-wrist rattles (string bottle caps or bells) are easily made.	
	Dances offer opportunity for creativity and communication.	Have pupils try making up their own square dance. They should choose a melody and sing a story with the dancing directions included in the song.	Pupils should clap hands to produce the beat and provide the rhythmic accompaniment.
		In a natural environment have pupils perform original "Indian" dances. Singing or chanting can accompany the dancing.	Some children may be interested in writing a musical composition, either with or without words.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Physical Education and Recreation	Physical needs, as well as others, can be met through group projects.	Class conservation projects can provide a variety of physical activity for all children. Projects may include shrub planting, soil building, playground renovation, clearing of a waterway, etc.	Pupils should see the relevance of the project and its contribution to the school and community.
	Physical fitness can be achieved in a variety of ways.	Construct an outdoor obstacle course with objects from nature. Have pupils participate against themselves, rather than against each other.	Some of the obstacles may include crossing over water, running around trees, swinging on a rope, and jumping over logs.
	Man uses his environment for leisure time pursuits.	Have pupils construct a large map of the local parks and recreation areas. Using a key they can identify the various recreational pursuits available. They may also use state maps, labeling state and national parks.	Discuss the importance of recreation and leisure time activities as a means of enriching ones life.
	Children should have first hand experiences in learning about the various aspects of sports.	Take the class on a field trip to visit a stadium, a practice session, a Hall of Fame, etc.	
		Arrange for the class to take a tour of a sporting goods manufacturing plant.	Discuss the different procedures that are necessary to complete a piece of equipment and the different materials used.
		When snow is available, take pupils snowshoeing on the school grounds. Children enjoy this activity and it contributes to the development of physical fitness.	Discuss the history of snowshoeing. Snowshoes for children are available from Faber and Company, Loretteville, Quebec, Canada.
	Objects from nature may be used for many different purposes.	On a trip to the woods find a long, sturdy grapevine that can be used for jumping. Two children hold the ends of the grapevine and swing it back and forth. The other children each take a turn at jumping.	Be sure that good conservation practices were followed in obtaining the grapevine. This activity can also be performed with music and rhythmical jumping patterns.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Physical Education and Recreation (cont'd.)	Learning can be reinforced through the use of games.	After studying the points of the compass have 8 or 16 players, depending on the number of points of the compass they have learned, stand in a large circle according to the correct name of each point. Another player, "It," stands outside the circle and calls out any direction (west). When he calls the direction, he runs into the circle, picks up a ball and tries to hit with the ball the player whose compass point he called. This player runs from the circle as soon as his point is called and must stop when "It" has the ball in his hand and calls "Stop." All players change points on the compass before the next game.	Use a soft 8-inch or 10-inch playground ball. Give as many children as possible the chance to be "It." Emphasize correct procedures for running, stopping and throwing.
		Place about 10 objects of nature that children can identify in a small area on the ground. Permit the children to look at the objects for one minute. Cover up the objects and have each child write what he has seen. The child with the most correct items is the winner.	The activity can be played with leaves, pictures of flowers or animals, rocks, etc. The number of objects can be increased as the pupils become more observant.
	Classroom games may be used to make learning an enjoyable experience.	Divide the class into groups and have each group make up a list of 10 or 12 things observed during a field trip. When the lists are finished, have each group rewrite the names in jumbled fashion on a different sheet of paper. Have the groups exchange lists and figure them out within a specified period of time.	A word such as "bird" might be written "rdbi" and "marsh" could be "rsahm." A similar type of activity could be done as a bulletin board project for other classes to figure out.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Science	Man changes his environment for his own use and these changes are either helpful or harmful.	Visit various areas of the community and observe what changes man has made in his environment. Discuss the values and disadvantages of these changes to man and other animals.	
		Take a trip to a natural area and see what changes man has made to benefit living things.	The thinning of trees to allow light to come through and the placement of bird feeders are examples of what pupils may observe.
	Gathering evidence on wildlife can be of value in learning scientific investigation.	Cast the tracks of animals. Class will need half-pint milk cartons, plaster of paris, and water. Put milk carton (with top and bottom cut out) over track, mix some plaster and pour into the container. Allow to dry 15-25 minutes. Pick up the carton and you now have a permanent record of this animal. The cast track also makes an interesting paper weight.	
	Rocks differ in the manner that they were formed.	Use a clue chart to identify rocks found on the school site, according to pupil given names. Afterwards invite an earth science teacher to classify them according to geologic names.	Devise your own clue chart. It may include some of the following: durability--soft, hard or crumbly; color; crystal shape; components--uniform or a mixture; texture--smooth, rough; density--heavy, light; color changes, grooving, differences in hardness, etc.
	Weather can be predicted through the use of instruments.	Using thermometers pupils can compare temperature differences in the following areas: snow and ice, sun and shade, deep water and shallow water, surface soil and subsoil, windy area and calm area.	Thermometers can be purchased inexpensively at government surplus stores.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Science (cont'd.)	All organisms are interrelated and interdependent.	Take the class to a field, a pond, and the woods and have them observe how these areas are similar and how they differ.	Compare such things as growth, sound, and soil. Discuss the fact that living organisms are dependent on their environment.
	Clear water may possess many substances not seen by the normal eye.	Have pupils collect water samples from a puddle, stream, pond, river, and the school faucet. Label the samples and take them back to the classroom for study under the microscope.	Discuss water pollution and what should be done to change the situation.
	It is possible to record the path of the sun.	Drive a stake into the ground at an angle equal to the degrees latitude of your region. The stake should point directly north. Starting with the first hour when the sun casts a shadow, mark off, using sticks or stones, the position of the shadow of the stake at each hour and half hour during the day.	Have the pupils obtain information about the latitude of your area.
	The type of surface an object has determines the amount of light that is reflected.	Take outside various flat objects that have different types of surface texture and colors. Put them where they will have the greatest amount of sun reflection. Have pupils stand away from them and observe the light reflection.	The smoothest and lightest objects should be the most reflective.
	A considerable amount of snowfall is necessary to equal a small amount of rainfall.	Let pupils fill a container with snow, place it in a warm place, and let it melt. Afterwards, figure out the number of inches of snow necessary to equal one inch of rainfall.	
	Insects form the largest group of animals.	Take the class on a nature walk to observe how many different types of insects they can see in relation to other animals. Insect collections can demonstrate the variety of insects.	To collect insects you should have a jar, a mesh net, straight pins, a mounting board, and a display board.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Science (cont'd.)	All living organisms require nourishment.	Visit a pond and identify organisms that eat smaller organisms as part of a food chain. Have pupils make up a food chain.	Food chains can be made up showing what rabbits eat, birds eat, frogs eat, etc.
	Changes in the environment affect the life and growth of living organisms.	Develop a small pond in an aquarium. Each day have pupils fill it with waste materials. As the pond fills up it ceases to be a pond. Discuss what happens to living organisms.	Relate this activity to ponds that the children know about or have observed on field trips.
	Heart rate increases as physical activity increases.	Have each child determine his pulse rate while seated in the classroom. Take the class outside and have them participate in vigorous physical activity. Then have them check their pulse rate again and compare it to the resting rate.	Calculate the average pulse rate for boys, for girls, and for the class.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Social Studies	All through history man has tended to settle near water and productive land.	During a visit to a natural area discuss with pupils whether it would have been a good place for early pioneers to settle. Discuss the natural resources that would have made it good and what disadvantages it would have had.	After returning to the classroom use reference materials in discussing the children's comments.
	Knowledge of local history helps people understand their community.	Have pupils visit a local cemetery. Divide into small groups and have them look for the graves of the youngest and oldest person buried there. Determine the average age of people buried there. Using adding machine tape and pencil to obtain rubbings of the gravestone information.	Emphasize that cemeteries are sacred places and proper respect should be shown.
	A knowledge of constructing and reading maps is important in today's world.	Have pupils construct a map of an area of the school grounds, making up a scale and key for the map. Using a map of the community have pupils locate a well-known place by following specific directions. Then give basic directions to another location from where the pupils are standing.	
	Museums help one appreciate the sacrifices and successes of our forefathers.	Take pupils to visit historical, cultural, and archeological museums that are located in the community.	
	The increase in population emphasizes the need for good conservation practices.	Have pupils compare a heavily wooded area with an open field. Discuss how man's removal of the timber has affected the birds, rabbits, and mice in the area.	Emphasize that man is depleting his natural resources and upsetting the balance of nature.
	Natural products are used by man for industrial purposes.	Take pupils on a trip to a paper manufacturing plant to learn about the processing of paper from raw material to finished product.	Excellent charts and diagrams on papermaking are available from the West Virginia Pulp and Paper Company.

Reference	Major Understandings and Fundamental Concepts	Suggested Learning Activities	Supplemental Information for Teachers
Intermediate Grades Social Studies (cont'd.)		Study the cross section of different types of trees. Discuss how the lumber from these trees is used by man.	
	In the early settlement of communities man was dependent upon natural resources for survival.	Take pupils to a high vantage point overlooking the community. Discuss with them the geographical areas that were settled first. Why?	Responses may include water supply, food, view of approaching strangers, industrial site.
	Industrial practices have been harmful to both man and his environment.	Have pupils visit a stream or river that has been polluted by local industry. Study the cause of the pollution and its effects upon man.	Discuss procedures that could be taken to eliminate the situation.

Suggested Teaching Materials for Outdoor Education

Acorns
Audubon teaching charts
Adhesive tape
Binoculars
Bird food
Bottles
Boxes
Cans
Carbon tetrachloride
Cardboard
Charcoal
Cloth bags
Clothespins
Compasses
Corncobs
Cornhusks
Cornsilk
Cotton
Dye
Feathers
Flower pots
Foil pie plates
Glass panes
Graph paper
Hickory nuts or walnuts
Ink
Insect jars
Jackknives
Jars
Leaves
Levels
Litmus paper
Live insect cage
Labels
Magnifying glasses
Maps
Masking tape
Metal cans
Metal foil
Microscope
Mirrors
Paraffin
Pebbles
Pine cones
Plant press
Plaster of Paris
Plastic food wrapping
Protractor
Rock hammers
Rulers
Sand
Seeds
Screen wire
Sticks
Stones
String
Tape measure
Thermometers
Tracing paper
Tree bark
Twigs
Waxpaper
Weather instruments
White enamel paint
White shellac
Wire

OUTDOOR EDUCATION

TEACHER REFERENCES

These supplementary aids have not been evaluated. The list is appended for teacher convenience only and teachers in the field are requested to critically evaluate the materials and to forward their comments to the Curriculum Development Center.

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Dembar Educational Services
Box 1605
Madison, Wisconsin 53701

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Box 299
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Northern Illinois University
Lorado Taft Field Campus
Oregon, Illinois 61061

The Conservationist
State Conservation Department
Division of Conservation Education
Albany, New York 12205

The Outdoor Educator
San Francisco State College
School of Education
1600 Halloway Avenue
San Francisco, California 94132

The Outdoor Teacher
Southern Illinois University
606½ South Marion
Carbondale, Illinois 62901

SOURCES OF ADDITIONAL MATERIALS AND INFORMATION

American Association for Health,
Physical Education and Recreation
Project Man's Environment
1201 16th Street, N. W.
Washington, D. C. 20036

American Association for Health,
Physical Education and Recreation
Council on Outdoor Education and Camping
College of Education
Michigan State University
East Lansing, Michigan 48823

American Camping Association
Bradford Woods
Martinsville, Indiana 46151

American Nature Association
1214 16th Street, N. W.
Washington, D. C. 20036

Conservation Foundation
1250 Connecticut Avenue
Washington, D. C. 20036

County Cooperative Extension Services
Roberts Hall
Cornell University
Ithaca, New York 14850

High Rock Conservation Center
300 Nevada Avenue
Staten Island, New York 10306

Izaak Walton League of America
1326 Waukegan Road
Glenview, Illinois 60025

National Audubon Society
1130 Fifth Avenue
New York, New York 10028

National Geographic Society
16th and M Streets, N. W.
Washington, D. C. 20036

National Wildlife Federation
1412 16th Street, N. W.
Washington, D. C. 20036

New York State Conservation Department
Albany, New York 12201

- Division of Lands and Forests
- Division of Fish and Game
- Division of Conservation Education
- Division of Parks
- Division of Motor Boats

New York State Department of Health
Albany, New York 12203

Community Health Services
Division of Air Resources
Division of Pure Waters
Environmental Health Services

New York State Education Department
Albany, New York 12224

Bureau of Elementary School Supervision
Bureau of School Library Services
Curriculum Development Center
Division of Communications
Division of General Education
Division of Health, Physical
Education and Recreation
Museum and Science Service
Office of Science and Technology

New York State Natural Beauty Commission
155 Washington Avenue
Albany, New York 12210

New York State Outdoor Education Association
Box 42
Albany, New York 12201

New York State Pure Waters Authority
41 State Street
Albany, New York

Resources for the Future, Inc.
1755 Massachusetts Avenue, N. W.
Washington, D. C. 20036

Sierra Club
250 West 57th Street
New York, New York 10019

United States Department of Agriculture
Soil Conservation Service
Washington, D. C. 20250

United States Department of the Interior
National Park Service
Washington, D. C. 20240

United States Office of Education
Coordinator for Environmental Education
400 Maryland Avenue, S. W.
Washington, D. C. 20202

THE UNIVERSITY OF THE STATE OF NEW YORK

Regents of the University (with years when terms expire)

1984	Joseph W. McGovern, A.B., LL.B., L.H.D., LL.D., D.C.L., Chancellor	New York
1985	Everett J. Penny, B.C.S., D.C.S., Vice Chancellor	White Plains
1978	Alexander J. Allan, Jr., LL.D., Litt.D.	Troy
1973	Charles W. Millard, Jr., A.B., LL.D., L.H.D.	Buffalo
1972	Carl H. Pforzheimer, Jr., A.B., M.B.A., D.C.S., H.H.D.	Purchase
1975	Edward M. M. Warburg, B.S., L.H.D.	New York
1977	Joseph T. King, LL.B.	Queens
1974	Joseph C. Indelicato, M.D.	Brooklyn
1976	Mrs. Helen B. Power, A.B., Litt.D., L.H.D.	Rochester
1979	Francis W. McGinley, B.S., LL.B., LL.D.	Glens Falls
1980	Max J. Rubin, LL.B., L.H.D.	New York
1971	Kenneth B. Clark, A.B., M.S., Ph.D., Litt.D.	Hastings on Hudson
1982	Stephen K. Bailey, A.B., B.A., M.A., Ph.D., LL.D.	Syracuse
1983	Harold E. Newcomb, B.A.	Owego
1981	Theodore M. Black, A.B.	Sands Point

President of the University and Commissioner of Education
Ewald B. Nyquist

Executive Deputy Commissioner of Education
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Associate Commissioner for Instructional Services
Philip B. Langworthy

Assistant Commissioner for Instructional Services (General Education)
Bernard F. Haake

Director, Curriculum Development Center
William E. Young

Chief, Bureau of Elementary Curriculum Development
Robert H. Johnstone

Director, Division of Health, Physical Education and Recreation
George H. Grover